

TRADITIONAL IRRIGATION TANKS IN NANDED DISTRICT (INDIA)

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ABSTRACT

India has a long tradition of construction of chain of tanks as rainwater harvesting structures for agriculture, fishing, domestic needs and groundwater recharge. The undulating topography of Deccan plateau provided a good base for these innovative but simple structures, which the early settlers developed with their indigenous skill and technical advice from local craftsmen. Tanks are eco-friendly, ensure groundwater recharge, and provide protective and efficient irrigation. During the medieval period village communities owned and managed the tank system, collected taxes without interference from the state. During British period the tank systems were transferred to the state. Even after independence in 1947, the role of tank as a source of irrigation is getting eroded continuously. Poor status of tanks is attributed to centralized administration resulting in breakdown of community institution and system failure due to meager resource allocation. Urbanization is a phenomenon affecting the tank ecosystem on the fringes of the cities and upcoming towns. The expansion of human settlements poses a big threat to the common properties like tanks which are owned by the state, are taken over by the various departments for the construction of government offices, housing colonies, bus stands and other utilities. It has been established beyond doubt that the cities like Chennai have faced major groundwater drought due to total elimination of water bodies, which existed in the middle of urban settlements. The Dharmabad block in Maharashtra has 46 tanks constructed in 18th century, out of which six tanks were around the town of Dharmabad. These tanks have lost the purpose for the reasons mentioned above. The paper presents the success story of people's initiatives in modernizing the tanks by improving storage capacity and efficient management of water through beneficiary participation. The Dharmabad local self-government body has prepared a beautification plan of the tank costing Rs6.5 million which consists of improving storage, garden around the tank, garden statues, bird houses etc. The statue of Lord Shiva (14m high) will be installed in the tank for which expenditure will be met from the people's contribution. 50% work has been completed. The temple of Lord Shiva in the premises will attract thousands of pilgrims, which will ensure sustainability of the project.

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INTRODUCTION

India has a long tradition of using small storages (manmade and natural) and diversion works for irrigating crops. These works, found throughout the country, are among the most important and widespread traditional devices of water harvesting. Most tanks in India are of ancient origin, with several dating back to the 4th and 5th centuries A.D. Though they are found in all parts of India, they are concentrated in the Southern states of Andhra Pradesh, Tamil Nadu, and Karnataka. In Tamil Nadu, for instance, under *mirasi* system of land tenure, maintenance of tanks was one of the community activities for which a part of the produce of the village was earmarked. There were functionaries specifically assigned the task of handling tank-related matters. In Karnataka, the village community entrusted the responsibility to a person or group of persons who were granted a certain amount of land or tax benefit for carrying out the function. Similar arrangements evidently existed in Andhra Pradesh as well.

Until the advent of large reservoir based systems, most of the irrigation consisted of small storages, local diversion canals drawn from streams and rivers and shallow wells. While the area under large canal system increased substantially, the traditional local surface works were the main sources at the time of independence. Tanks are one of the oldest and important sources of irrigation and were maintained and managed by local communities. The community had their traditional organization and staff to ensure fair distribution of water among users. There are epigraphs dating 600AD to show how management of irrigation was looked after through farmers' committees.

INDIGENOUS TANK SYSTEMS

As one of the oldest man-made ecosystems, the tank system consists of (i) a bund or a dam which is generally of earth, but is also sometimes partly or fully masonry, (ii) anicut and feeder channels to divert water from adjoining catchments, (iii) a waste weir to dispose of surplus flood water, (iv) sluice or sluices to let out water for irrigation, and (v) conveyance and distribution system.

From various perspectives, the tank system is referred as;

- A management system as it is capable of becoming administratively and financially a self-reliant structure.
- A social system as the tank serves and benefits various sections of the village community such as farmers, fisher folk, animal rearers etc. The indigenous systems of tank irrigation are one of the surviving largest pool resources because:
- They are eco-friendly, i.e., a proper management of the system would itself ensure protection and preservation of the environment. They serve both as flood moderators in times of heavy rainfall and as drought mitigations in times of long dry spell.
- Of being widely dispersed, if revived to their original capacity, they would ensure ground recharge and direct irrigation in rain fed areas.
- Of being numerous, small in size and spread over thousands of villages, they lend themselves to decentralized management which would better ensure their care and upkeep than any government department can ever provide.

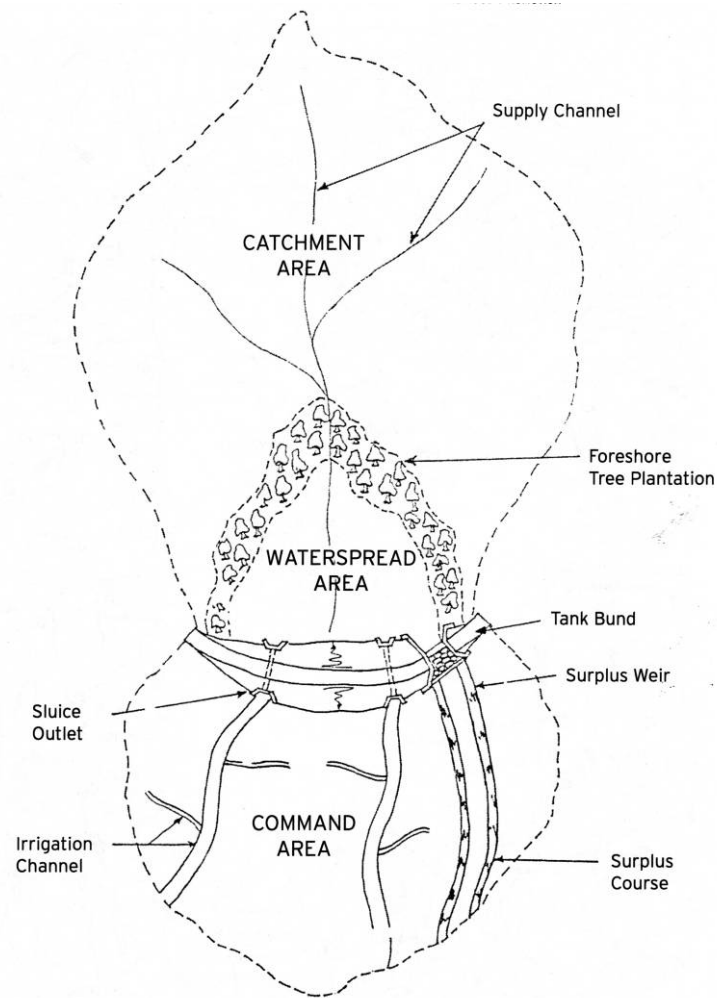


Figure 1. Schematic diagram of tank system

REASONS FOR DECLINE OF TANKS

There are numerous reasons for this decline each of which can be broadly characterized as representing economic, technical or social aspects of tank irrigation. Some of them are listed below.

- i) Unreliable water availability
- ii) Lack of profitability
- iii) Poor tank conditions
- a) Heavy siltation in tank beds and supply channels
- b) Encroachment into places as tank foreshores, water spread areas and supply channels
- c) Deforestation in catchment area
- d) Defective tank structures such as leaky sluices and weak bunds

Since 1960-61 due to the rapid expansion in well irrigation and the poor maintenance of tanks have combined to drop tank irrigation's share of the irrigated area to only 11.6 percent. After knowing Government investment in Minor Irrigation (having irrigation potential from 101 ha to 2000 ha) and importance of tank irrigation, there is urgent need to conserve the tanks to bring back the lost potential. In Maharashtra, the tanks (with irrigation potential less than 40 ha) have been known for their traditional irrigation system. If these are made functional, livelihood of marginal farmers dependent on these tanks can be ensured.

CHARACTERISTICS OF TANKS OF DHARMABAD

The rain fed irrigation tanks known as "Malguzari" tanks are found in the one-time Nizam (one of the emperors) state, i.e. parts of Andhra Pradesh, Karnataka and Maharashtra. Those were built about 200-300 years back by the kings and the landlords. As these tanks were source of revenue to the Nizam government, they were known as Malguzari tanks ('Malguzari' means revenue).

Malguzari tanks found predominantly in Nagpur, Chandrapur, Bhandara, and Nanded districts of Maharashtra are traditional irrigation tanks. The *koli* community built these tanks with their traditional knowledge and wisdom. They took into consideration various factors like catchment area, slope and soil type. Amazingly, they built tanks in series in such a way that the excess water (runoff) from the up stream tank feeds the tank at lower side. They constructed two types of tanks; bigger ones known as *Talav* which could irrigate more than 100 ha land and smaller ones, called *kunta* having command areas less than 100 ha. *Kuntas* were not much useful for irrigation and fishery where as the *Talav* held water even in summer, which was used as drinking water for livestock, washing cloths and other domestic purpose. There are 106 Malguzari tanks in Nanded district out of which Dharmabad block has a concentration of 46 tanks. Following figure shows the tanks in 14 villages of Dharmabad block.

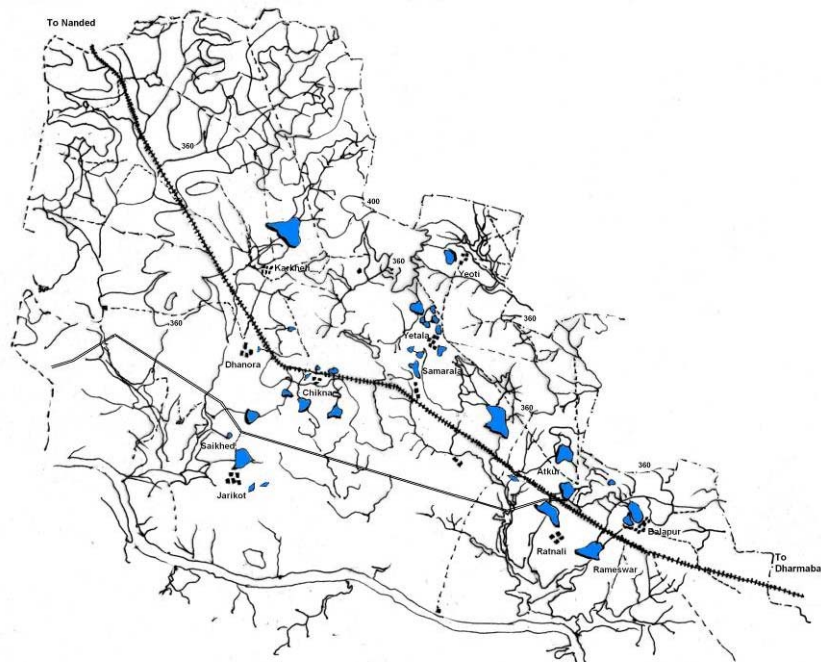


Figure 2. Location of Malguzari tanks in Dharmabad block of Nanded district

The Government of India has the responsibility for developing water resources but little control over water distribution. The present system of water distribution is vested with the local village people; in few cases village committees. It is supposed that the major maintenance works on tanks under control of Zilla Parishad (Z.P.) such as tank repairing bunds, tank sluices and breaches above the main canal outlet. Maintenance works below the canal outlet is primarily the responsibility of the farmers and the Panchayat union. Normally the water is released from the tank by a waterman called *Nirdee* who is paid by the villagers in kind. The appointment of Nirdee is made by local committees and is hereditary but he can be replaced if his service is found to be inadequate. Nirdee has also the responsibility of equitable and efficient water use at farm level but their main job is to open and close the tank sluice as directed by the farmers



Regulation of tank water by Nirdee



Spindle and rod mechanism of the outlet

Figure 3 Water regulating mechanism through sluice outlet (Tumbh)

A tank cascade is a chain of tanks located one above another within a sub-watershed. In tank cascades, drainage from one tank forms the major inflow to the next lower tank this cascade system had been functional but over time period it is disturbed which needs repair of linking of tank system. Such cascades are seen in all the 14 villages of Dharmabad block.

Because of the hydrological interconnections, development of one tank can affect other tanks and other water users. Although tank hydrology has a strong influence on groundwater in the form of increased water level, increasing capacities of tanks located in the upper sections of the cascade may reduce the inflows to the lower tanks. These linkages imply that water resources development plans should focus on tank cascades rather than on individual tanks.

FARMERS' INVOLVEMENT

The tank farmers belonging to Dharmabad tanks are marginal farmers and their land holding size varies between 0.1 ha to 1 ha. The farmers being the largest stakeholders in the tank system, their livelihood is dependent on performance of the tanks. It is observed that whenever tanks get injured, the marginal farmers take initiation to make tanks functional by availing local resources. They are found to have tried maintaining tank system so that at least one season crop could be cultivated. Some of the non-stakeholders are also supporting to manage tanks through *grampanchayat* (local administrative body) or through voluntary work.

Most of the efforts were contributed towards augmenting tank storage through desilting feeder channel and tank bed. A large scale weed removal, and desilting of feeder channel and tank bed was undertaken by the Government of Maharashtra in 2005. The works / activities were aimed to involve peoples' participation in the form of labor and /or cash at the cost of diesel required for running machinery provided for desilting. The program '*Mahatma Phule Jal and Bhoomi Sanvardhan Abhiyan*' was launched to execute these activities by district level administration in Dharmabad. The villagers of Balapur were involved in executing these activities.

Though the tanks have been taken over by the government, the village communities still play a crucial role in the maintenance of tanks. Farmers contribute both physical labor and money for various tank management works. For mobilizing the required labor/money generally an informal meeting of farmers (not all the villagers) at the beginning of the season is arranged in order to decide what kind of maintenance work should be taken up and how to mobilize funds/labor. In some cases, the exact contributions are decided on the basis of the nature and urgency of the work to be taken up and the physical condition of different tank structures. Activities that are taken up very frequently are the cleaning up of supply channels and diverting water from the upstream, and minor repairs to sluices, surplus weirs and tank bunds. Labor-intensive activities such as cleaning supply channels are done by the farmers themselves, which is equally shared among all farmers irrespective of the extent of land owned under the tank command. Minor activities such as repairs to sluices, surplus weirs and bunds, which do not require labor from all farmers, are done by hired labor and the expenditure towards such works is met from the funds mobilized for the purpose.

Some of the tanks have been successful in raising amount of revenue through auction of fishes for running tanks. These fishes after getting matured are sold through auction. The rights of auctioning are vested with Zilla Parishad(District Council). In few villages fishing community has established society.. The local villagers and their collective bodies are not allowed to raise such revenues from the tanks.

The Maharashtra Water Resources Regulatory Authority Act 2005 which allows the farmers to take over water bodies for management, which covers all water bodies including malguzari tanks. Under "National Project for restoration, repair and renovation of water bodies directly linked to agriculture", an attempt was done by local sector (Z.P.) to divert funds from central government for renovation of tanks.

CASE STUDY OF DHARMABAD

An organization named 'Prakriti Foundation' took initiative to survey the conditions of the tanks in Dharmabad taluka with a view to restore the glory of the ancient system. Prakriti Foundation organized two meetings of the villagers of Balapur in March and April 2002. The plan of action for renovation of the Balapur tank was discussed and decided to repair the feeder channel and desilting by performing *shramadan* (contributing labour). The work began on 15th April 2002 with the participation of 40 people working two hours daily for a month. It resulted into the repairs of 1 km channel. This had positive impact on the neighboring village (Rameshwar village) and they started visiting the site. Meanwhile the Government of Maharashtra accelerated the renovation of the tank by launching "Mahatma Phule Jal Bhoomi Abhiyan", which brought in earth moving machinery at the cost of fuel only. 45Mton of silt was removed from the tank in May 2002. Municipal Council of Dharmabad paid the cost of fuel for the machinery, since the tank was in the municipal limits. Second feeder channel was also repaired. This had increased storage capacity of the tank and strengthened the bund. Similar work of desilting by using Government machinery was approved consequent upon the request of the villagers of Rameshwar. Similar awareness has been experienced in village Samarala this year due to the training camp organized for the 'youth for rural development'

Desilting of Balapur tank was done again in 2003 summer by employing the Government machinery for which the cost of fuel was shared by one local industry and two local administrative bodies. Farmers of the adjoining area had taken advantage of the silt by applying it to their fields. Municipal Council had prepared a road of 20m width and of length 500m around the tank by using the silt extracted during desilting. The success of this programme has laid the foundation for the innovative project launched by the Municipal Council. The project consist of a) road around the tank b) garden and garden statue for children c) electrification d) seating arrangement round the tank e) shops f) pitching and pointing of tank g) statue of Lord Shiva h) transplantation of big old coconut trees form elsewhere. The proposal for these works was submitted to Government of Maharashtra state, which has in turn sanctioned INR 3 million. The roads, garden and tree plantation work is in progress. RCC platform for Lord Shiva will be obtained by donation from potential donor. The appeal has been sent to prospective donors. With a view to attract tourists to Dharmabad and to improve the economy of the township, it was thought of putting it on the map of tourism. The pilgrimage centre Basar, very famous for the Goddess Saraswati temple, is just 7 km away from Dharmabad. The vicinity of Basar has enhanced the possibility of developing Dharmabad as tourism centre. Ambitious plan of INR 20 million was submitted to the Government of India under Integrated Development of Small and Medium Towns which included; a) Construction of shortest road from Dharmabad to Basar passing over Balapur tank (7 km length) b) Administrative building of Municipal Corporation and commercial complex c) Krantiteerth- a museum to install the statues of freedom fighters of freedom movement of India presenting life sketch of each martyr d) Meditation hall and exhibition in the Krantiteerth. The height (15cm) of statue of Lord Shiva in Balapur tank is planned in such a way that the same will be visible from the train so as to attract the tourists going to Basar. The amount of INR 20 million has been sanctioned by the Government of India and construction activity of road and building has been started.



Figure 4 Beautification Plan of Tank

PEOPLE'S INITIATIVE FOR ENVIRONMENT PROTECTION

The people of Dharmabad who were moved by the damaged condition of Balapur tank initiated modernization of tank. There were various social organizations that have participated in the endeavor by contributing labor and money. The people also supported beautification campaign launched by the Municipal Council. 20 tricycles were employed to collect solid waste daily from the houses and waste is being safely disposed off (which is not usually seen in similar towns). Hutatma Smarak; a memorial for the freedom fighters of India, had been converted into a live memorial place. It was again a people's initiative in 1995, which had developed a botanical garden, a library and reading room with seating arrangements. It is now a picnic spot for the people as the Hutatma Smarak is situated on a hill. With an objective of involving people in the tree plantation programme, the Municipal Council has presented saplings to the married women on the religious occasion. They were requested to plant and grow the trees around their houses. This scheme was successful and yielded good results.

MODERNIZATION MEASURES FOR TANK SYSTEM

In order to meet the growing human and environmental water needs and restore the tank ecosystem, a new strategy is required. This strategy should provide for appropriate instruments for the tank dependent agriculture while keeping the multiple utilization of tanks intact, to ensure a sustainable livelihood to the people. This means, establishing comprehensive tank system development programmes at watershed and river basin levels. An alliance of all the stakeholders concerned ranging from government, philanthropy, village communities, Panchayats and general public should be organized. The development strategies should have both short term and long-term technical solutions. The short-term opportunities include on-farm development works through modernization of existing irrigation facilities/structures and conjunctive use of surface

and ground water resources. The long term challenges consist of establishing water grids connecting these modernized tanks in a chain to mitigate drought and flood at local level as well as encouraging the farmers' participation in planning and management of these irrigation facilities for sustaining the agriculture of this area.

To attain maximum field productivity, water must be supplied and regulated in such a way that maximum production could be obtained from the available tank water. Another avenue for safe-guarding the poor is to promote policies that encourage diversification of cropping patterns away from rice. Crop diversification may increase incomes and reduce the demand for water, which may enable poor farmers to purchase water from the emerging competitive water markets. To complement the above options, tank structures should be repaired for effective water control. Instead of continuous water withdrawal from tanks, tank management strategies such as sluice rotation (opening and closing of sluices on alternate weeks) will help save the tank water.

INSTITUTIONAL MECHANISM

The tank systems, which have survived over several centuries, were known for their institutional mechanisms related to tanks governing the issues like i) Administration ii) Management iii) Revenue generation iv) Conflict resolution and v) Water management.

For any system to sustain needs some kind of mechanism. Similarly the system can not run on its own but requires some kind of institution. The institution is formed by bringing the group of people together to perform some functions. One of such water institution is Water Users Association (WUA). With reference to the study conducted in Dharmabad block and traditional wisdom of managing the tank systems available with the people following proposals are worked out for modernizing the irrigated agriculture.

- Tanks must be desilted periodically so as to restore their original capacity. This would be possible by enforcing all the stakeholders to participate in cleaning the feeder channel and tank bed. This could be achieved by allowing the farmers work voluntarily or by employing laborers, or by giving labor wages as a substitute to both above. There should be checks and controls over increasing population settlement in the route of inflow, and encroachment of foreshore area through cultivation. All this may be necessary but not sufficient condition. To bring the efforts fruitful, the institution should be empowered with strong legislative rights to take action against the encroachments, excessive digging of land to procure material for development works etc.
- The youngsters should be tried to restart the cultural activities (related with the tank system) which have been discontinued due to some reasons, or they should be promoted to create the activities. This way somehow they would be associated with the system.
- There was no coordination found amongst different tank farmers in a village. This can be achieved by both the upstream and downstream farmers at Tank Federation (TFA) level. This would enable negotiation between upstream and downstream tank farmers to get water in their tank during times of scarcity and would help in understanding problems and difficulties associated with tank system.

- The institution should seek the tank system to develop as a tourism center around which urbanization has started developing or likely to be developed in future.
- Revenue generation can be mobilized through auction of usufructs, levying local cess and tax on tank water utilization, levying tax on well water utilization. The common property resources rights over tank assets should be given to the local village tank associations on a sharing basis with the local Panchayat. Such a measure would strengthen the local village tank associations in building their own funds for maintenance of tanks apart from using a common property for a useful purpose.
- The specific category of weed that grows and appears to be trouble in tank storage, could be used for producing biogas and bio fertilizer.
- The cooperation and coordination between pisciculture federation and the Tank Federation (TFA) should be developed and should be tried for further strengthening. The relationship with Forestry Department should be established and further strengthened in order to enhance financial viability of the institution through plantation and horticulture crops on catchment areas.
- The PRIs (Panchayat Raj Institutions) and WUAs should be as distinct as possible. Otherwise the local PRIs' interests will appear more in terms of acquiring political clout than to demand more powers to strengthen the institution itself.

CONCLUSIONS

In spite of the fact that it is difficult to protect, conserve and modernize the historical tank system against impact of urbanization, it can be done by reviving the cultural values around water bodies and through participatory management. People's participation is an essential component for handling small tank systems which has been accepted and encouraged by the Government of Maharashtra. These tanks as a result of people's initiative will be handed over to the WUAs in near future.

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